

AMENDMENTS TO THE SPECIFICATION

Please replace Paragraph 4 on Page 2 with the following rewritten paragraph:

[0004] One approach to overcoming power amplifier nonlinearity utilizes the function $f(x) = 2x/(1+x^2)$ for amplitude predistortion and the function ~~$ph(x) = (Bf(x))/6 = 2Bx/6(1+x^2)$~~ $ph(x) = (\pi f(x))/6 = 2\pi x/6(1+x^2)$ for phase predistortion, where x is the instantaneous value of the envelope. Another approach to overcoming amplitude distortion is to utilize the “cuber” function $f(x) = x+x^3/3$, where again x is the instantaneous value of the envelope. These approaches have been found to provide less than optimum linearity in the power amplifier output.

Please replace Paragraph 19 on Page 6 with the following rewritten paragraph:

[0019] The output from the apparatus of Figure 1 is provided by power amplifier 64 to antenna 66. Radio frequency coupler 70 couples a portion of that output to envelope detector 72. The detected envelope is applied to analog-to-digital converter 73 which samples at a high sampling rate, shown in Figure 1 as a sampling rate of 50 megasamples per second (MSPS). The output of analog-to-digital converter 73 is normalized by normalizing circuit 74 so that its maximum value equals 1. The output of calculation circuit 16 is applied through delay circuit 76 to a positive input of summing circuit 78, while the output from normalizing circuit 74 is applied to a negative input of the summing circuit. The input to summing circuit 78 from calculation circuit 16 represents the envelope before distortion, while the input to summing circuit 78 from normalizing circuit 74 represents the envelope after distortion. Delay circuit 76 assures

that each undistorted sample is summed with the normalized output resulting from that same sample. The resulting signal from summing circuit 78 is applied to one input of multiplier 80 which receives a weighting factor of $-\frac{\lambda}{2}$ at its second input. The output from multiplier 80 is applied to one input of multiplying circuit 82 which receives the output from normalizing circuit 74 at its second input. The output from multiplying circuit 82 is applied through low pass filter 84 to sampler 86 which applies samples of that output at periodic intervals of, for example, one minute to integrator 88. The output of integrator 88 is a scaling factor C and is applied to one input of multiplying circuit 90 which receives the x_k outputs from calculation circuit 16 at its second input. The output of multiplier circuit 90 is thus Cx_k .

Please replace Paragraph 21 on Page with the following rewritten paragraph:

[0021] The x_k output from calculation circuit 16 is also applied as an input to multiplier 92 which receives the value $\pi/6$ at its second input. The Cx_k output from multiplier circuit 90 is applied to calculation circuit 94 which calculates the value $\tanh(Cx_k)$ and applies that value to an input of multiplier 96. Calculation circuit 94 might be a lookup table, for example. The second input of multiplier 96 receives the value $\pi x_k/6$ from multiplier 92. The output of multiplier 96 is thus $(\pi x_k \tanh(Cx_k))/6 = \Phi_k$. This value is applied to lookup table 98 which provides as outputs the values $I_k' = +\cos(\Phi_k)$ and $Q_k' = -\sin(\Phi_k)$. These values are applied to inputs of multiplier pair 100 which receives the output of lookup table 40 at its second input.

Please replace Paragraph 25 on Page 8 with the following rewritten paragraph:

[0025] The feedback circuit of Figure 1 results in the signal C that is applied from integrator 88 to multiplier 90 converging to the current value of the transfer function C of output amplifier 64. It is possible to set the gain of the feedback loop so that it converges in just a few iterations. The value of the feedback gain $\frac{1}{\lambda}$ which guarantees stable conversion is upper bounded by the mean square value of the feedback envelope after being normalized by circuit 74.

Please replace Paragraph 27 on Page 9 with the following rewritten paragraph:

[0027] Figure 3 is a plot of power amplifier output as a function of signal input for (1) a computer simulated system in accordance with the present invention with the scaling factor $C = 0.7$, (2) a computer simulated system utilizing the cubic function $f(x) = x + x^3/3$, and (3) a computer simulated system utilizing the functions $f(x) = 2x/(1+x^2)$ and $\phi(x) = 2\pi x/6(1+x^2)$, showing the superiority of the present invention.